Remarks:

Claims 1-19 are in this case. All claims have been rejected. Claims 1 and 7-9 are canceled. New claims 11-19 clarify the structural importance of the specific types of directional taps used to produce the tap assembly in a single optical package. This compact form is distinguished form prior art wavelength stabilized sources that are built using bulk optical components. Several of the dependent claims have been renumbered to depend on new independent claim 11. New dependent claim 13 is supported in the Specification at page 6, lines 5-7). Dependent claims similar to 2-6, 10, 12, and 13 are made dependent on new independent claim 14. No new matter is added. The new claims are further explained in applicants' arguments below. A sentence has been added to the Specification calling out reference designator 102 in figs. 1 and 2. The package is unambiguously shown in the figures as originally filed, and thus the reference does not constitute new matter.

REJECTION UNDER 35 U.S.C. §112:

This rejection is believed inapplicable to the claims as amended. The term "one or more taps" in the original claims had been previously amended to "a pair of taps" as is disclosed in the Specification and shown in figs. 1 and 2. The previous argument was that a directional tap comprises taps that provide an optical signal indicative of the magnitude of the light in different directions. The Examiner rejected the term "a pair of taps" as unsupported by the specification. The Examiner reads the specification as calling for a single [directional] tap.

NEW CLAIMS CLARIFY THE DIRECTIONAL TAP
AND EMPHASIZE COMPACT OPTICAL PACKAGE 102:

Optical package 102 comprises the entire directional tap. The directional tap comprising a fiber grating can be fabricated into a single optical package 102 (figs. 1 and 2). Wavelength stabilization techniques of the prior art rely on bulk optical configurations. They are not amenable to compact packaging as can be achieved in the instant invention. The claims have been redrafted to emphasize the forms of taps that make this compact structure possible in the new context of an ultra fast optical pulse generator.

New independent claim 11 calls for a tilted grating tap coupled to the light source and the Bragg grating for tapping a signal representative of the light supplied to the grating and a signal representative of the light reflected or transmitted by the grating. This claim is supported by the specification at page 5, lines 6-7, and figs. 1 and 2, showing a pictorial representation of a tilted grating tap. An important aspect of the tilted grating tap is that no optical fiber is used to couple the "tapped" signals to photodetectors 104, as shown in figs. 1 and 2. It can be seen that photodetectors 104 can simply "view" the tapped signals through air or vacuum.

New claim 12 calls for a tilted grating tap wherein the tilted grating tap comprises a PM (polarization maintaining) grating. This claim is supported by the specification at page 5, lines 16-17. The advantage of using a PM fiber grating is that the polarization sensitivity of the grating can be reduced.

New independent claim 14 calls for a fused fiber PM coupler as the directional tap. Here, a fused fiber PM fiber coupler is coupled to the light source and the Bragg grating for tapping a signal representative of the light supplied to the grating and a signal representative of the light reflected or transmitted by the grating. Although slightly less compact than the tilted grating tap, the fused fiber PM coupler is another relatively compact alternative to the bulk optics solutions

of the prior art. Support for this claim is found at page 5, lines 6-7, and page 6, lines 2-3.

REJECTION UNDER 35 U.S.C. §103:

Claims 1-10 are previously rejected under 35 U.S.C. §103 as obvious over U.S. Patent No. 5,299,212, "*Article comprising a wavelength-stabilized semiconductor laser*", issued March 29, 1994 to Koch, et al. (hereinafter "Koch") in view of U.S. Patent No. 5,673,129, "*WDM optical communication systems with wavelength stabilized optical selectors*", issued September 30, 1997 to Koch, et al. (hereinafter "Koch"). These rejections are believed inapplicable to the claims as amended.

It is well established in order for a combination of references to make a claimed invention obvious, the references must teach or suggest every limitation of the claim.

The invention calls for an optical pulse source for generating RZ pulses at a wavelength λ. Tapped signals representative of the light supplied to the grating and the light reflected or transmitted by the grating, in combination with a feedback circuit responsive to the tapped signals, are used to adjust the wavelength λ of the light source. The tapped structure can be made very compact by use of tilted fiber tap or a fused fiber PM coupler. The references are wholly devoid of tapped signals derived from either a tilted fiber tap or a fused fiber PM coupler.

RZ (return to zero) pulse sources are used in WDM and DWDM optical communication systems. RZ pulse sources have been built previously using variety of laser modulator configurations. But, these implementations have required high mechanical stability (e.g. mode locked lasers, Specification, page 2, lines 7-8) and power inefficient and of large size (e.g. a CW laser / $LiNbO_3$ modulator combination, Specification, page 2, lines 19-25).

The inventor's have developed a robust, compact, and power efficient RZ optical pulse source that can be fabricated into compact optical packages. The invention employs a direct modulated laser modulated in power and frequency, and locked to the edge of the wavelength response curve of a fiber grating. The optical pulse generator uses a compact and robust tilted grating tap or a fused fiber PM coupler to develop the feedback signals. The use of these taps enabled the inventors to package the grating / tap structure and photodetectors into a single compact optical package. (Specification, figs. 1, 2, element 102). Wavelength stabilization systems using gratings according to the prior art have employed various types of bulk optical components. Such construction precluded the compact form made possible by the instant invention.

Koch discloses a wavelength stabilized laser that solved a previous problem where there is more than one transmission minimum precluding laser wavelength lock at one unique wavelength on cold startup. Koch does not disclose an optical pulse generator where the light source is modulated in power and frequency. Further, Koch's solution relies on bulk optical components. (Koch, fig. 3). Koch's feedback loop is rudimentary and is not capable of shaping ultra fast pulses as is done by the inventive optical pulse generator (Specification, page 6, lines 4-16).

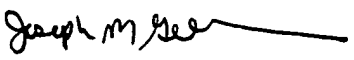
Mizrahi also discloses a wavelength stabilized laser system, not a pulse source. And, Mizrahi does not contemplate modulation in the context of a feedback loop controlling the laser wavelength so as to operate on the generated pulse shape. Rather it is in the context of simply modulating a wavelength-stabilized laser. (Mizrahi, col. 6, lines 12-19).

Furthermore, Mizrahi discloses optical taps as bulk optical components connected by optical fibers. (see for example Mizrahi col. 12, line 7, where signals are routed by fiber). By contrast, the compact optical directional tap package of the inventive pulse generator cannot be constructed using Mizrahi's bulk optical components.

Neither Koch nor Mizrahi taken alone or in combination, teach, suggest, or motivate one skilled in the art to build the generator of the instant invention. And, neither reference discloses an import aspect of the invention, the use of a directional tap comprising a tilted fiber tap or a fused fiber PM coupler as opposed to the bulk optics of the prior art.

All rejections are believed inapplicable to the claims as amended. It is believe that the application fully complies with all provisions of 35 U.S.C. §112 and 35 U.S.C. §103. It is therefore respectfully suggested that the application should be allowed.

Respectfully submitted,



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